

TABLE OF CONTENTS

CERTIFICATION	i
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
CHAPTER 1: INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives.....	2
1.4 Scope of Study	2
CHAPTER 2: LITERATURE REVIEW	3
2.1 Introduction to Sand Control.....	3
2.1.1 Definition of Sand Control.....	3
2.1.2 Basic Types of Sandstone Formation.....	3
2.1.3 Reasons for Sand Production	3
2.1.4 Why is Sand Production Undesirable?.....	5
2.2 Available Methods of Sand Control.....	6
2.2.1 Production Restriction.....	6
2.2.2 Mechanical Methods	6
2.2.3 Gravel Packs.....	7
2.2.4 Cased Hole Gravel Pack.....	7
2.2.5 Open Hole Gravel Pack.....	8
2.2.6 Slurry Packs	9
2.2.7 High Rate Water Packs	10
2.2.8 Water Packs.....	10
2.2.9 Frac Packs	11

2.2.10 Chemical Consolidation	12
2.2.11 Combination Methods.....	12
2.3 Proppant Types	13
2.3.1 Sand.....	13
2.3.2 Resin Coated Sand	14
2.3.3 Sintered Bauxite	15
2.3.4 Intermediate Strength Proppant	15
2.4 API Standards of Proppant	15
2.5 Comparison of Characteristics of Proppant	16
2.5.1 Comparison of Specific Gravity and Porosity in Different Size of Proppant Type	16
2.5.2 Mechanical Properties of Proppant	18
2.5.3 Propped Fracture Conductivity	19
2.6 Types of Resin for Coating	20
2.7 Types of Resin Coated Sand	20
2.7.1 Curable	20
2.7.2 Precured	22
2.8 Curable Resin Coated Proppants in Sand Control Application	23
2.9 Effect of Fracturing and Reservoir Fluids on Unconfined Compressive Strength (UCS) of Proppant Plugs	23
CHAPTER 3: METHODOLOGY.....	25
3.1 FYP I	25
3.1.1 Preliminary Study	25
3.1.2 Pre-experimental Work.....	25
3.2 FYP II	26
3.3 Project Timeline	28
3.4 Tools Required.....	29

CHAPTER 4:	RESULTS AND DISCUSSION	30
	4.1 Analysis of resin coated proppant	30
	4.1.1 Effect of Different Portion of Coating Silica Sand	30
	4.1.2 Effect of Different Resin Concentration of Coating Silica Sand	32
	4.1.2.1 Unconfined Compressive Strength	32
	4.1.2.2 Porosity and Permeability	34
	4.1.2.3 Summary of Resin Coated Silica Sand.	35
	4.1.3 Effect of Resin Coated in Solid Production in Gravel Packing Application	36
CHAPTER 5:	CONCLUSION AND RECOMMENDATIONS	39
REFERENCES		40

LIST OF FIGURES

Figure 2.1	Typical Component of Gravel Packing Sand Control	8
Figure 2.2	Ottawa Sand	14
Figure 2.3	Resin-Coated Sand	14
Figure 2.4	Sintered Bauxite	14
Figure 2.5	Low Density Ceramics	14
Figure 2.6	Proppant Application Ranges	18
Figure 2.7	Graph of Premeability(darcy) VS Closure Stress(Mpa)	19
Figure 2.8	Stress Reduction Due to Proppant Pack Bonding	21
Figure 2.9	Curable Resin Coated Sand Bonding	21
Figure 2.10	Embedment Effect in the Formation	22
Figure 2.11	Stress Reductions Due to Deformable Resin Coating	22
Figure 2.12	Unconfined Compressive Strength for RCP	
	Sample A1,B1 and C1 Prepared in Various Fluid 1-4	14
Figure 3.1	Process Flow of the Project	27
Figure 3.2	Tools Required (Porosimeter, Compression Test, and Mould	29
Figure 4.1	Resin Coated Samples in Different Resin Concentration	30
Figure 4.2	Summary of Unconfined Compressive Strength VS Different Sample Portions	31
Figure 4.3	Cubic Sample of Different Resin Concentration	32
Figure 4.4	SEM of Resin Coated Sand cured at 230°F for 24 hours	33
Figure 4.5	Compressive Strength with Different Resin Concentration	33

Figure 4.6	Summary of Permeability and Porosity of Resin Coated Silica Sand in Different Resin Concentration	35
Figure 4.7	Unconfined Compressive Strength and Permeability vs Resin Concentration	36
Figure 4.8	Comparison Between Sand Gravel Pack And Resin Coated Gravel Pack	36
Figure 4.9	15% of Resin Coated with Different Pressure in Gravel Packing Application	37
Figure 4.10	Solid Production of Different % Resin Coated and Closure Stress	38
Figure 4.11	Comparison of Solid Production of Different % Resin with 30/80 Sand	38

LIST OF TABLES

Table 2.1	Physical Properties of Sand	13
Table 2.2	Diameter of Proppant in Different Mesh Size	16
Table 2.3	Comparison of Specific Gravity and Porosity in Different Size of Proppant Type	17
Table 2.4	Specific Gravity and Maximum Closure Stress of Proppant	18
Table 3.1	Parameter used in Resin Coated Sand Sample Preparation	26
Table 3.2	Final Year Project I (May 2012) proposed activities timeline	28
Table 3.3	Final Year Project II (Sep 2012) proposed activities timeline	28
Table 4.1	Effect of Different Portion of Coating Silica Sand	31

LIST OF FORMULAS

Formula 1	The Fracture Conductivity	19
-----------	---------------------------	----